



ENSN Launch
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Neuroscience and Society:
a multidendritic neuron

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Abstract

This report is a synoptic review of the proceedings of the European Neuroscience and Society Network (ENSN) launch. ENSN, is a European forum that discusses the social, political, economic, and ethical implications of the brain sciences from a multidisciplinary approach. Since it is the leading European forum of its kind, it is worthwhile reflecting on the various debates raised by the experts convened from different academic and professional backgrounds. In the first part of the report, I recapitulate the plenary lectures and workshops and intercalate them with a few thoughts and analyses. The second part is a systematic analysis of the different key themes, issues, and challenges raised and debated during the two-day conference. This could constitute an epistemic framework for further investigation of the impact and implications of the main controversial claims and new concepts that are emerging amidst unprecedented developments in the fastest growing scientific field of the past and present century. I conclude by underlining the importance of such a network of scientists and social scientists in examining the emerging fields of the ‘new brain sciences’.

Keywords: ENSN; neurosciences; new brain sciences; neuroethics; neuroeconomy; neuropolitics; neurochemical self; European public forum;

1. Introduction

The European Neuroscience and Society Network (ENSN)¹ was launched on November 12 and 13th, 2007 at the Regent's College in London (UK) with almost a hundred participants from Europe, the USA, and Australia. ENSN is funded by the European Science Foundation (ESF) and convened by researchers at the BIOS centre for the study of bioscience, biomedicine, biotechnology and society at the London School of Economics and Political Science (LSE).

The network aims to provide an interdisciplinary platform that bring together social scientists, neuroscientists, and practitioners who are engaging with recent advances in the new brain sciences. The growing forum enables and supports theoretical and empirical investigations into the ethical, legal, political, and social implications of the neurosciences, with a focus on the following four key themes that were emphasized during the launch:

- Neuroethics and beyond: setting an agenda for Europe
- Public health and the politics of the neurosciences
- Neuroeconomies: markets, choice and neurotechnologies
- Sources of the neurochemical self: consciousness, personhood and difference

The following synoptic review of the ENSN launch is twofold. The first part is an overview of the main plenary lectures and workshops intercalated with a few thoughts, impressions, and analyses. The second part is an analytical summary of the key issues and themes that were raised and discussed, and that need further investigation. It should be noted that the report does not claim to be exhaustive. Rather, the aim is to capture the agenda framed by the participants by examining the different problems, arguments, and analyses discussed and/or raised during the two-day conference. I conclude by underlining the important role ENSN can play in bridging the neurosciences and the social sciences.

2. Description with intercalated analyses

Nikolas Rose, director of the BIOS centre at LSE and ENSN Chair, opened the launch with a lecture entitled 'Neurosocieties: the rise and impact of the new brain sciences' setting the stage for the conference in the packed room of the Darwin building. As he argued, there has been many debates over the implications of what could be referred to, at least over the past decade, as 'the new brain sciences' with only *social neuroscience* and *neuroethics* as the two main fields at the forefront of the debate. However, neither of them have been grounded 'in a sound empirical knowledge' of what is *actually* happening in those fields and what are the *actual* implications when they move 'from the laboratory to the field'. Neuroethics and social neuroscience have been largely 'speculative' though the former has been more wary and the latter more optimistic as to the possible implications of the brain related advances on human behaviour and 'human nature'.

Hence, the need to try to transform those hypothetical implications into a more substantive and informed debate through a multidisciplinary programme such as ENSN. It intends to bring together neuroscientists and social scientists for some informed debate about the two fields, the reality of the debate, and the nature and implications of those advances. It

¹ For more information about ENSN check <http://www.neurosocieties.eu/Default.htm>

ultimately aims at building a ‘durable infrastructure’ for a genuinely trans-disciplinary debate and to clarify the methods to be used for debate and policy.

Four key themes underlined the launch event. These will set the stage for further elaboration and scrutiny:

- Set an agenda for the kind of work ENSN wants for Europe in the field of neuroscience and society
- Understand the key issues and key challenges of concern to public health and neuroscience
- Understand the key economic driving forces and market choices in this emerging ‘neuroeconomy’ and their underlying ethical implications
- Set the key issues pertaining to concepts such as personhood, identity, and difference.

2.1 Public health and the politics of the neurosciences

The first plenary presentation was given by Simon Gregor from the Medicines and Healthcare Regulation Agency (MHRA)-a last minute replacement for Kent Woods, Chief Executive for MHRA, who was unable to attend. Gregor opened his overview of drug regulation with the 2004 Selective Serotonin Reuptake Inhibitor (SSRI) controversy. He outlined the four main elements in the way that the MHRA dealt with the crisis, namely in terms of timeliness, openness, willingness to listen, and clinician engagement. He frequently raised the issue that public ‘perception’ is as important as ‘truth’ and the need for a more substantial public involvement in policy-making.

He stressed the deep connection of the MHRA to the social context despite the fact that this is a scientific organization guided by scientific decision-making and scientific empirical evidence. Gregor insisted that a scientific decision is a ‘social decision’ and gave three reasons:

- The recent developments in research and technology
- The changing patterns of healthcare and society where patient engagement and power play a central role
- The changing dynamics of institutions and the changing international framework

He then highlighted some striking figures in a questionnaire that aimed at showing the public perception about drug regulation and risk². Some of the results were shocking but unsurprising to those more familiar with the hospital setting. In this questionnaire it was shown for instance, that physicians primarily trust pharmacists when it comes to informing them about the risks and safety associated with drugs. Conversely, pharmacists trust pharmaceutical companies. And this finding is quite telling, it means that physicians ultimately receive the information related to drug safety and risks from the pharmaceutical industry.

The second plenary lecture under the same theme was by Matilde Leonardi, from the Neurological Institute Carlo Besta in Italy. Her lecture entitled, ‘Neurosciences and Neuropolitics: the challenge of brain disorders’ was largely an argument in favour of the

² Available on the MHRA website
http://www.mhra.gov.uk/home/idcplg?IdcService=SS_GET_PAGE&nodeId=5 (Accessed December 2007)

World Health Organization's (WHO) methodological change in its appraisal of brain disorders by changing the epidemiological indicator of assessment.

She argued in favour of shifting from the 'old indicators' to the 'new indicators', such as Quality Adjusted Life Years (QALYs) and Disability Adjusted Life Years (DALYs),³ that she believed shed the light more accurately and more comprehensively on the reality of the 'global burden' of brain disorders. She argued that this shift more visibly shows the new priorities associated with the disease burden for the following reasons. First, because governments inadequately cover their national mental health burden. Second, because of the so-called phenomenon of 'compression of morbidities'⁴ associated with brain disorders. Third, because of the limitations of statistical tools; 'different questions capture different answers, and mere statistics are not sufficient'.

The 'neuropolitics' theme underlining her presentation centred around three main axes:

- **The power of knowledge:** For Leonardi 'Information is power, if you are not counted, you simply don't count'. Thus the need to shift albeit radically to the new epidemiological indicators for the assessment of the local and global burden of brain disorders.
- **The power of semantics:** Brain disorders are an issue of 'semantics' by which she meant that politicians and authorities in each country set the threshold of what is to count as disability or sickness.
- **The power of the psychosocial model and the limits of the strictly medical model:** The former model adopted by the WHO should also be adopted by local governments, stressed Leonardi. As she put it, politics should go beyond mere diagnoses. This should be the case because clinical symptoms are different from the impact of the disease on the function (clinical and functional recoveries). In other words, the missing-link in appraising the burden of the disease is the acknowledgement and inclusion of the many *meta-diagnosis* dimensions.

A number of themes arose in the following Q&A. Many questions sought clarification from the MHRA on its procedures and practices. Other themes included:

- Scepticism about the assessment of the Global Burden of Disease (GBD) and the data claiming such a global burden. While the idea of the 'burden' of brain disorders was a powerful mobilize, the term 'burden' had also been contested because of its pejorative connotations and its historical resonances (to arguments that certain sectors of a population should be limited or eliminated as they are a burden on the fit).
- The issue of 'disability versus disease' and how one can reconcile the social and medical models.
- The controversies around certain drugs such as Vioxx and subsequently the 'legitimate' scepticism vis-à-vis the claims formulated by the psycho-pharmaceutical industry.

³ For an analytical criticism of such measurements see Anand S, Peter F, Sen AK. 2004. *Public health, ethics, and equity*. Oxford ; New York: Oxford University Press. viii, 316 p. pp.

⁴ The compression of morbidities hypothesis was developed by Fries (1980). The assumption is that if morbidities can be delayed with the introduction of better lifestyles and medical care then the years spent with a disability or morbidity will be 'compressed' to a short period of time before death that is around 85 years old, the average life span in developed countries.

- The shift from paternalism to alliance or what Gregor called ‘compliance to concordance’ in the doctor-patient relationship to strengthen trust and establish a relationship between autonomous rather than paternalistic agents.

2.2 Sources of the Neurochemical Self: Consciousness, Personhood and Difference

The second plenary session opened with a talk by Alexandre Mauron, a molecular biologist and bioethicist from the University of Geneva. Mauron’s main argument was to argue for a new framework of neuroethics, namely a new synthesis from different disciplines under the aegis of neuroethics where ‘stress’, in particular, is the kernel. Why stress? Because it is rooted in social causes. In fact, the steeper ‘the social gradient’ (say, in terms of class divisions) the worse off the society.

Drawing on findings from the fields of physiopathology, neuro-endocrinology, primate studies, evolutionary studies, and neuroscience cognitive psychology, Mauron thus proposed to set ‘stress’ as a paradigm for any debate on ‘neuroethics’. He based his arguments on the ‘neuroscientific evidence in animal models’ which demonstrates how the experience of environmental stress lead to clear differences at the neuronal level. In humans, this environmental stress arises from poor social conditions and is associated with social inequality. This ultimately translates on the neuronal level.

Mauron argued that this new vision of a ‘neuroscience of stress’ has ‘biopolitical consequences’ as it provides a clear neuroscientific basis for the link between *health inequality* and *social inequality*. This ‘new face of neuroethics’ rests on a tripod: The ethics of neuroscience, a neuroscience of ethics, and a neuroscience of equity-that is to say, of how social structures impinge on our health.

The second presentation in this session was by Iilina Singh, Wellcome Trust University lecturer in bioethics and society at LSE, on theories of personhood in relation to Attention Deficit and Hyperactivity Disorder (ADHD), under the (revised) title, ‘Nurture-Neuroethics Intellectual and Social Ethos’. The presentation shed the light on some bioethical concerns about the use of psychotropic drugs with children and introduced the idea of children as *active* participants giving them for the first time perhaps a public voice in the debate on psychiatric diagnoses and therapeutics.

The first issue Singh tried to elucidate was perception held by children about the relation between their brain and their behaviour. In other words, how do children who receive pharmacotherapy, such as Ritalin (a psychostimulant used in ADHD), see themselves in relation to their brain. And vice versa how do they perceive the role played by their brain vis-à-vis their behaviour and mood. There are two answers to this, what Singh labels ‘a theory of nerves’ and a ‘war theory’. These two ways of thinking can be captured in the series of drawings executed by those children, some of which were shown during the presentation.

The second issue concerned conceptions of the relation of the brain to the self. The preliminary evidence from the research suggests that these conceptions concern ‘fantasy’ versus ‘ideal life’. An example cited was children’s fear of replacing their brain if they had the opportunity to do so. Singh suggested, on the basis of her interviews, that at the basis of all these latent fears and phantasmagorias lies the idea of *memory* (rather than behaviour) as what fundamentally makes us who we are. The third issue raised by her interviews concerned the relation of behaviour to self in particular issues of self-esteem and self-perception.

The Q&A session that followed the two presentations raised three key issues:

- A discussion about psychiatric classification and categorization (scientific vs. heuristic devices)
- The highlight of a paradox lying at the heart of our economies revealed in Mauron's lecture: 'economic efficiency' values inequalities, yet simultaneously recognizes that these inequalities 'make us sick'.
- A problem of causality was highlighted regarding the problem of Ritalin and the related bad self-images these children with ADHD have. An 'inversion of causality' was suggested: maybe it is the psychostimulant itself, Ritalin, that makes these children have a bad self-image and not the other way around. But to confirm the claim it must be shown that other children who do not suffer from ADHD should develop bad self-images when given therapeutic doses of Ritalin. Needless to say it would be ethically controversial to perform such a study.

2.3 Neuroeconomies: markets, choice, and the distribution of neurotechnologies

Zack Lynch, executive director of the California-based Neurotechnology Industry Organization (NIO), opened the third session which was to become a significant 'iconoclash'⁵. His presentation on 'The Global Neurotechnology Industry in 2007 and Beyond' shed light on the recent 'neuromarket' trends in the USA and across the globe, in terms of patent trends and investment. He mapped the nascent neuro-emerging markets from China to San Francisco passing by Stockholm and Germany, and analyzed the sector's overall trend and performance in terms of its increasing investment in neuro-devices and neuro-technologies (brain-chips, brain imaging, deep brain stimulation, neuro-stimulation for obesity, and so on) (Lynch & Lynch 2007).

He had, through two years work, developed a special NASDAQ index, termed the 'NERV index', in reference to 'nerves' or 'nervous system'. This would allow stakeholders and investors to follow the trend of these neurotech-markets; what he calls 'emerging global neurosocieties'. He followed this analysis with a discussion of a number of historical breakthroughs to 'illuminate the future' that are increasingly witnessing a shift from illness to enhancement-what he calls 'lifestyle improvement expansion' or 'neuroenablement'. And these produce 'market potentials as unique market drivers'. Neuroenablement encompasses cognition, emotions and sensations, and refers to 'a shifting up from the bottom', that is, better performance in achieving better results than what is sought. His vision depicted a new kind of Darwinian survival of the fittest, a 'neuro-fittest-survival' one might say whereby neuroenablement becomes a source of 'neurocompetitive advantage'.

Furthermore Lynch argued that neurofinance would ultimately impact societal relations. Neurotechnologies have two-faces: the good side is the benefits and advantages it brings about but the other facet is the coexisting element of 'coercion'. The latter could be illustrated for instance as the dangerous potential it has in shaping the memory of entire populations. But besides that farfetched and apocalyptic scenario Lynch seemed rather optimistic. He believes that there is a societal 'perception shift' that will be the driving force behind a new 'post-industrial, post-informational neurosociety.'

Lynch's presentation proved provocative for a sceptical audience. The first symptom of this iconoclash emerged in Philippe Pignarre's lecture on 'The Birth of Neuroeconomy'.

⁵ To borrow the term from Latour and Weibel (2002).

Neuroeconomy, what he calls ‘the Psy function’ (in reference to Foucault), includes the psycho-pharmaceutical industry, psychiatric drugs per se, psychiatrists, and the patients. He traced two key moments in the development of this ‘function’. First, the birth of Chlorpromazine in 1952, that he considers as the beginning of ‘alienation’ and ‘chronicity’ in psychiatry⁶. Second, the move from the asylum to the private practice and how this transformation was conceived in psychoanalysis under Freud. He suggested that, today, we are not witnessing the emergence of a ‘neuroeconomy’ but rather an emerging neuro-field that is driving ‘a new economy’.

He then pursued his historical account of psychotropic drugs and referred to the emerging new drugs as a ‘phylum lineage’. These drugs were being invented to obtain only a minimal difference; a process that looks more like a sort of machinery or what Deleuze and Guattari (1987) call a ‘*machine*’. Thus the phylum produces a machine (or machinery) that interacts with other machines (social, research, medical etc.). And the concept or analogy to the machine produces two sorts of new concepts: a ‘light biology’ which refers to the ‘instrument’ (such as dopamine) and a ‘light psychology’ which replaces the psychic device of the psychoanalyst (such as the Diagnostic and Statistical Manual, DSM). These two notions interact dynamically to transform the physician and *then* the patient. Psychoanalysis ‘invented psychiatry out of the asylum’, and psychiatry outside the asylum came of age with new psychotropic drugs.

He suggested three frameworks to examine this new field. First, Lakoff’s (2006) idea of ‘pharmaceutical reason’ to characterize the way of thinking that was emerging. Second, Ian Hacking’s (1999) conception of ‘ecological niche’ to suggest that each ‘condition’ can only thrive when it has a niche or particular environment within which it can flourish. Third, Callon et al’s idea of the construction of markets and economies⁷ because ‘neuroeconomy never pre-exists but is always built’. Economics produces economies, and hence neuroeconomics plays a key role in producing ‘neuroeconomies’. And such economies include both human and ‘nom-human’ actors as Latour (2007) and other actor-network-theorists suggest. An account of the formation of a neuroeconomy must therefore include all participating actors, the ‘pills and the angry patients’.

The heated Q&A that followed included the subsequent key points:

- **Methods vs. Questions:** Rather than thinking in terms of a certain *method* designed to answer the question, it would be better to start by correctly formulating the question. This is how steering committee member, Kenneth Hugdhal, argued in relation to brain imaging and the claim that it can potentially ‘detect’ lying or ‘hidden intentions’⁸(Haynes et al 2007). Instead of researching whether brain imaging can be used in lie-detection for example, we should rather start with the question, what do we mean by lying? Indeed, what do we mean by responsibility? And what is the relationship between a normal or abnormal brain imaging and responsibility. If, say, the brain imaging of the convicted turns out to be ‘abnormal’ although s/he acted

⁶ In reference to the French psychiatrist Georges Lantéri-Laura.

⁷ See for instance Mackenzie D, Muniesa F, Siu L. 2007. *Do economists make markets? : on the performativity of economics*. Princeton, N.J.: Princeton University Press. 373 p. pp.

⁸ “Brain scan ‘sees hidden thoughts’”, April 2005, BBC News <http://news.bbc.co.uk/2/hi/health/4472355.stm> (Retrieved December 2007)

responsibly, does this ‘abnormal’ finding detected by brain imaging have any relevance anymore?⁹

- **Neuro-age and neuro-industry:** Pignarre referred to *Cerveau et la Pensée* by (Feldmeyer 2002) in which there is a depiction of a new ‘neuro-age’ scenario as part of a market strategy undertaken by the neuro-industry itself. Similarly he suggested that we live in such a neuro-age driven by the neuro-industry.
- **The public arena vis-à-vis ‘cosmetic neurology’¹⁰:** One discussant suggested that the public would be reluctant to accept enhancement applications because of the view that the neuro-industry is ‘creating’ new psychiatric categories to fit these enhancement applications. But isn’t enhancement in terms of boosting your memory, attention, concentration, and intellectual productivity desirable by many?¹¹ And what is the evidence for the claim that that the ‘neuro-industry is creating new psychiatric categories for some commercial gain and benefit’? And even in such a case, what is the evidence that the public is engaged in such controversies?
- **Nano vs. neuro:** the claims made on behalf of each are similar but the difference is that the development of nanotechnology has been the focus of public debate while the neuro-technologies have not.
- **Either/or, that is not the question!** To be productive and constructive, the debate needs to go beyond the polemical and dichotomous interchange between crude scepticism and blind faith in the neurotechnologies.
- **From the laboratory to the market:** Pignarre argued that the analysis of the developing neurosocieties should take a more modest path, not making sweeping claims, but focusing on the development and deployment of particular technologies.

2.4 Workshop I: Neuroeconomies

The first workshop was led by Paul Martin, a senior lecturer and deputy director of the Institute for the Study of Biorisks and Society from the University of Nottingham and Ilpo Helén, adjunct professor of sociology from the University of Helsinki. The main ideas can be summarized as follows:

- **‘Mobilizing the future in the present’:** according to Pignarre our current corpus of knowledge (and consequently our market) is built on ‘imperfect models’. He argued (without substantial evidence) that an example of such an imperfect model is the life shortening associated with the intake of psychiatric drugs, not revealed by Randomized Control Trials (RCTs).
- **‘Temporality’ and the neuromarket:** A neuroeconomy would be ‘ephemeral’ according to Pignarre because each of its components evolves independently and has its own dynamics. In other words, there is no cohesiveness and thus no potential sustainability of such a market. A neuroeconomy is a ‘co-production of promising fields [and] cultural change’. It is ‘in action’ as Latour (2007) says about science.
- **On specificity:** To the question of what makes the neuroeconomy *sui generis*, what differentiates it from bioeconomy or information technology economy for instance, Lynch’s answer was an exclusive reference to its products, (e.g. neurodevices) and the

⁹ This argument was raised during an informal discussion with psychiatrist George Szmukler from the Institute of Psychiatry.

¹⁰ See for example, Chatterjee A. 2004. Cosmetic neurology: The controversy over enhancing movement, mentation, and mood. *Neurology* 63:968-74, Chatterjee A. 2006. The promise and predicament of cosmetic neurology. *Journal of Medical Ethics* 32:110-3 Chatterjee A. (2004).

¹¹ Chatterjee A. (2006).

size and magnitude of investment. But is this all what there is to say about these new kinds of emerging markets?

2.5 Workshop II: The Sources of the Neurochemical Self

The second workshop was led by Kenneth Hugdahl a psycho-physiologist from the University of Bergen, Norway and Cordula Nitsch a medical doctor and neuroscientist from the University of Basel, Switzerland. Four key issues were set:

- Are psychotropic drugs a threat to human nature?
 - Increase in psychiatric diagnosis
 - Treatment/Enhancement dichotomy
- What is the ‘mind’ or the ‘self’?
- What can imaging techniques *really* do (underlined by the discussants)
 - The issue of specificity/sensitivity
 - Group data vs. individual data
- Neuroscience of Ethics (NE) vs. the Ethics of Neuroscience (EN)

The discussion largely evolved on the last point, whether there is a difference between these two notions. It was agreed that NE accounts for the discipline of ethics or morality on neuroscientific grounds. In other words, NE views morality in neurophysiological terms. Conversely, EN is a set of ethical frameworks raised by the study of neuroscience per se.

Some other loose ideas that were raised included:

- The role of emotions in moral decision-making as an instance of the intricate process of ‘mentalization’.
- The issue of brain *specificity*: should we speak of the different functions of the brain in terms of specific functions, (attention, morality, greed, and so on), or in terms of general activation patterns? In the latter case, how should we interpret brain activation? Should we establish a relation/correlation with different specific mental processes? Hugdahl argued that the search for specificity of mental states is fundamentally *wrong* philosophically speaking. Take the example of lie-detection. Contrarily to what is claimed, a brain imaging does not tell us whether the person lies. It is a description of a certain state, like anxiety and/or fear that we ‘normally’ *associate* with lying. Another reason why it is flawed is that hemodynamic images reflect *average* group data with *specific statistical* criteria that have their own limitations and margins of error. Specificity thus described by Hugdahl is merely an illusion.
- The ‘extended mind theory’¹² as a basis for a theory of mind. When I am told to write on the board a mathematical equation, it is not solely my brain that is computing and analyzing, and my hand, which is mechanically translating that abstract mathematical mental process. My mind *extends* outside the brain and my body to encompass the environment including the board and everything else. The environment is hence included in the mental process¹³.
- Scepticism and controversies around the notion of ‘human nature’. This is an old debate that had to be raised ultimately. Nonetheless the discussion was non-productive because it simply ignored the long historical and philosophical debate over

¹² See for instance Clark A, Chalmers D. 1998. The Extended Mind. *Analysis* 58:7-19

¹³ This typically illustrates a ‘materialistic’ approach which clearly contrasts with Cartesian dualism.

human nature. In any event, the question was badly formulated for it implicitly assumed Cartesian dualism as a *fait accompli* despite the many existing non-western philosophies and other theories that do not necessarily view the mind-body problem in a dichotomous way.

- Issues related to enhancement, self-perception, and psychotropic addiction were also debated. Psycho-pharmacologist Jaanus Harro underlined two points. First, enhancement is not necessarily bad. An example of a good form of enhancement is adequate sleep. Second, we should define what enhancement means before proceeding further. Caffeine for example is a chemical enhancer which actually ‘inhibits the inhibition’ physiologically speaking. So enhancement to what? To the memory, to the performance, to a ‘normal’ or disturbed function? And what is enhancement? Is it a mere physiological process, the overall effect on the targeted mental activity or both? (Check 3.7 for further discussion and further references)

2.6 Workshop III: Public Health and Policies of Neuroscience

The discussion was led by anthropologist and neuroscientist, Andreas Roepstorff, from the University of Aarhus and João Arriscado Nunes, a sociologist from the University of Coimbra. The discussion centred on three main axes: Issues related to intervention and regulation; the political groups or forums that are ‘supposed’ to rally around the brain-related policy issues; and the problems of categorization and categorical diagnosis.

2.7 Workshop IV: Neuroscience, Society, and the future directions of Europe

The last topic was led by professor of theory and history of psychology, Trudy Dehue, from the University of Groningen and professor of clinical psychology, Ilse Kryspin-Exner, from the University of Vienna. The debate evolved along the following questions:

- Is there a European drive to neuroscience? Is there a difference with its American counterpart?
- Popular knowledge of neuroscience: how do people gain knowledge? What is the role of the media? Or does the media have a role?
- What is the future of equity?

And here are a few additional remarks and points that were debated:

- Who are the people who are setting the agenda? Is it a democratic forum or is it shaped by upstream consultancy ahead of the new technologies?¹⁴
- Is there a need for public consultation? Is there a difference between ‘collective’ versus ‘private’ concerns? Technology, for instance, was agreed to be a social concern and thus affecting the ‘collective.’
- Are we anticipating too much ahead of time? Is a public debate vis-à-vis technology helpful in that respect?
- What is it that the public industry rather than ‘Europe’ ought to do?
- The era of the brain feels like a dramatic change because of the sharp contrast with a prevailing traditional discourse that was immunized against a biological perception. Hence it seems that the era of the brain is announcing a new paradigmatic shift in thinking. In that line of thought, it is important to understand the background of the problematic and the emerging discourse.

¹⁴ As pointed out by Nikolas Rose.

2.8 A *Threefold Cord*?

The last plenary lecture centred on the ‘Brain, Mind and Society: the Threefold Cord’ by Alain Ehrenberg from the Centre National de la Recherche Scientifique (CNRS). This intricate and ambiguous lecture rested on three parts. The first part situated subjectivity in neural and social frameworks. The second part centred on a ‘scientific experiment’ illustrated by empathy. The third part tackled the epistemological grounds of the ‘naturalization of subjectivity’, what Ehrenberg baptized as ‘a magical theory of science’.

Empathy was chosen because of its link to (i) human sociality, (ii) psychopathologies such as autism, schizophrenia, deviant behaviours etc. and (iii) the ‘mirror-neuron theory’. Empathy was seen as a good case study of the interwoven dynamics of the neural and social sciences and the typical reductionist approach of the former¹⁵.

The second part, evolved on the idea of ‘the social man’ and the differences between ‘biological facts’ and ‘social facts’. ‘Institution is to social order what function is to the biological order’ argued Ehrenberg. Biological facts are descriptive while social facts are ‘meaningful’¹⁶. Furthermore, biological facts are related to a ‘living whole’ but this is an empirical and individual territory whereas social facts are associated with a social whole, i.e., a more complex relation between complementary elements.

However Ehrenberg’s position could arguably typify what Latour (2007) calls the ‘sociologists of the social’ in contradistinction to ‘the sociologists of *associations*’ (Actor Network Theorists). This point was implicitly raised by Philippe Pignarre during the following Q&A. From a Latourian perspective there is no ‘social facts’ let alone ‘biological facts’. ‘Social, for ANT, is the name of a type of momentary association which is characterized by the way it gathers together into new shapes’ writes Latour. Furthermore, to start from ‘social facts’, ‘social forces’ or any of those ‘ether-like elements’ would amount to derive an inference from the premise (Latour 2007). And this is a flawed argument.

2.9 A *Latourian Q&A*

Pignarre raised an interesting point à propos of Ehrenberg’s exclusion of ‘nonhuman actors’ in reference to Latour (2007) who defines them as objects that many social scientists, precisely ‘the sociologists of the social’ overlook in their analysis of ‘the social’. Pignarre argued that failing to follow these inanimate objects, such as the psychotropic drug, the interaction, different meanings and dimensions they create, impoverishes and obscures the analysis. Objects are important in understanding the landscape of ‘social ties’ and social powers so dear to the sociologist of the social (Latour 2007). As Pignarre put it, ‘nonhumans redistribute the different elements’ and thus their crucial role in allowing a panoramic and maybe more authentic view of the landscape.

This Q&A ended with Nikolas Rose’s conclusive remarks and an expression I found striking but whose author I fail to remember. As Rose put it, some of the key questions that would need further investigation are:

¹⁵ Ehrenberg mentioned social neuroscientist Jean Decety whose theory of social behavior and social interaction rests on experimental measuring of ‘mismatches’-say between a facial expression and the underlying neural activity. And this according to Ehrenberg illustrates a typical reductionist understanding of empathy. See for instance Ruby P, Decety J. 2001. Effect of subjective perspective taking during simulation of action: a PET investigation of agency. *Nat Neurosci* 4:546-50.

¹⁶ In reference to Mauss M. 1967. *The gift; forms and functions of exchange in archaic societies*. New York,: Norton. xiv, 130 p. pp.

- Issues related to public policy and the public sphere
- Empirical questions
- Key issues related to research methods to explore these new territories laid out by the ‘new brain sciences’
- Epistemological and ontological questions that need to be at the heart of the debate

The expression by the unknown author is the ‘neurolization of culture’. It nicely summarizes the interaction between knowledge, public opinion, expert opinion, culture, and media, all of which were raised during the conference as potential topics awaiting further investigation.

3. Analytical Summary

In this part I summarize the key themes, issues, and challenges debated and raised during the two-day conference. This constitutes the epistemic framework of what needs to be further investigated to better clarify the many uncertainties that lie at the interface of recent advances in the brain sciences, their ethical and socio-political dimensions.

3.1 *The European Public Forum*

- What is the public debate on the new advances in the brain sciences particularly those related to neuro-technology? Is there a need for public consultation? What is the public *perception* vis-à-vis the new advances, and the implications brought about by the different fields of the brain sciences?
- What is the role of the media in shaping, diffusing, indeed using neuroscientific claims for certain political or other ends?¹⁷
- What are the claims in the different disciplines and sub-disciplines of the brain sciences and their potential ethical and socio-political concerns? What do we *really* know?
- There is a lack and thus a need of dialogue and communication between the different stakeholders.
- How are scientific decisions made and should the public more substantially engage in such decision-making whether related to drug regulation, risks, or intervention?
- What are the political groups supposedly rallying around the brain-related issues? Can they be identified? In that respect, is this political rallying a new form of ‘biosociality’ (Rabinow 1999)?
- In regard to shaping the agenda are we talking about a democratic forum or an upstream consultancy?
- Is there a particular European drive to neuroscience? Is there a need for a ‘European voice’ in the ongoing debate? What are the differences between the European and the American drive and agendas?
- What are the ‘collective’ vs. ‘public’ concerns related to the new advances in the brain sciences?

3.2 *Problem of Specificity*

The problem of specificity was tackled under two headings: neuroimaging and neuroeconomy. This notion must be applied as well to all the other neurotechnologies.

¹⁷ A recent example is the ‘experiment’ the American television ABC did by hiring a market research company called Lucid Systems to analyze the brain of a group of undecided New Hampshire voters: “Brain Imaging Shows the ‘Unspoken Truth’ About Politics”, January 7, 2008
<http://abcnews.go.com/GMA/Vote2008/story?id=4096535&page=1> (Accessed December 2007)

Concerning neuroimaging:

- There is a need to delineate the reality of the controversy by uncovering the claims that are made and formulated by the scientific community as well as by the media or what Fleck (1979) calls ‘popular knowledge’.
- What can a neuroimage really measure?
- How do we define a mental state? What are the mental processes that we try to detect via brain imaging? What are our expectations?
- What are the implications for criminal justice, the military and other-related fields?¹⁸
- There is a need to formulate the *questions* rather than the *methods* that we expect brain imaging to answer.

Concerning neuroeconomy:

Regarding the idea and concept of a market, what do mean by a ‘neuroeconomy’ and a ‘neuromarket’? What frames their dynamics, driving forces, and boundaries? And who are the players? What makes them *sui generis*? On the other hand, what are the implications of the emerging field of ‘neuroeconomics’ that draws on neuroscientific findings to inform ‘economic behavior’ (such as decision making)? Stated differently, what are the implications of a neuroeconomic-analysis of human behaviour?¹⁹

3.3 *Controversies around the methodology in psychiatry*

- What are the issues related to categorization in psychiatry, and the much broader implications of the methodology involved in delineating the ‘normal’ and the ‘pathological’?
- What are the problems and implications of the epidemiological assessment of the GBD and the recent shift of statistical tools of its assessment? What are the implications of such *shift* in the order of priorities and in introducing or creating *new* priorities?
- More discussion should be invested in clearly delineating the two models namely the biopsychosocial vs. medical (vs. other models that were not considered during the conference) and the implications of every model.
- Clinical trials regarding psychotropic drugs. What is the nature of those trials? What are their limitations? How are they designed? Can we build our corpus of knowledge of the psychiatric diagnosis on the results, assumptions, and limitations of such trials²⁰? Or is Pignarre’s version that we are building a corpus of knowledge on ‘imperfect models’ more realistic?

3.4 *A Problem of Definition?*

There were equivocal definitions throughout the discussions. More effort should be put to define the following emerging terms and concepts:

- **Neuropolitics:** During the conference, that term referred to the interaction between knowledge, power, political discourse, and policy-making in promoting or favouring

¹⁸ Check the working paper of the President’s Council on Bioethics http://www.bioethics.gov/topics/neuro_index.html (Accessed December 2007)

¹⁹ Leading and emerging ‘neuroeconomics labs’ are located in Stanford <http://neuroeconlab.stanford.edu/> and Caltech <http://www.hss.caltech.edu/~camerer/> (Both accessed December 2007)

²⁰ For an exhaustive introduction to the philosophical and ethical issues related to Randomized Control Trials (RCTs) check the special issue of *BioSocieties*, ‘The construction and governance of Randomized Control Trials’, Volume 2, Part 1, March 2007.

one model over the other. But neuropolitics have been used in other contexts as well, such as for instance in the use of neuroscientific findings to explain political behaviour. In regard to the former definition, how do the different neuro-agendas compare across the globe and specifically in Europe and the USA? What are the societal, political, ethical, and economic implications (if any) of those different agendas?

- **Neuroeconomy:** What are the counter-arguments to Pignarre's theory that it is the 'neurofield' that is driving or creating a neuromarket and not vice versa? Anne Lovell raised the issue of *productivity* as one of the driving forces behind 'failed applications' and imperfect models. But is that all that could be said? On another note, is Zack Lynch's understanding of a 'neurosociety', in terms of neuromarket dynamics and investment, the other extreme of the spectrum? Lastly are Pignarre and Lynch's views necessarily mutually exclusive?
- **Neurofinance:** Can we speak of a neurofinance vs. a neuroeconomy? The former would include a more empirical study of neuro-investment, emerging neuro-markets, trends in neuro-related-patents, neuro-index (NERV). Or is this a symptom of a 'neuro-age and neuro-industry' that Pignarre denounced as part of a 'messianic market strategy'?
- **Neurosociety:** This new concept seemed to be nominalistic. Many different definitions were formulated during the conference. As an example, Lynch's neurosociety is a society *investing* in neurotechnologies. Actually, it is a society that has *faith* in the advances in neurotechnologies. The other possible versions and definitions of a 'neurosociety' were not raised. Moreover, what is the dynamics between the triad, 'neuroeconomy', neurotechnology and 'neurosociety'?
- **Enhancement vs. neuroenablement:** Both notions seem to converge to what Lynch refers to as a 'neurocompetitive advantage'. So what is the real difference if any between the two concepts?
- **The Self tout court**
 - Theories of personhood and subjectivity: how are we to analyze the 'biomedical self' (Stepnisky 2007) or indeed the 'neurochemical self' (Rose 2003)? Stepnisky suggests a threefold theoretical approach to the self namely the naturalistic, the post-structuralist and the hermeneutics (à la Charles Taylor). He chose the latter approach for it captures what is essentially missing everywhere, the 'authentic self'. But is it truly the case? What are the other possible conceptual and theoretical approaches to notions of self and selfhood?
 - What are the impact and implications of psychiatric diagnoses in emerging identities and subjectivities? A recent study is Emily Martin's (2007) ethnographic work on bipolar disorder.
 - The impact of (neuro)technology on identity and group formation: does technology define population groups? Conversely do population groups use technology to define and fit themselves in particular groups?
- **The Mind:** Although this may sound as an old type of rhetoric, the concept and theories of mind were vaguely touched upon. What is the relation between the different elements of the tripartite 'body, mind, world' or the 'threefold cord' that Ehrenberg was keen on establishing its intimate cohesiveness? Are we seeing a novel way of framing this tripartite relationship?
- **Neurobehaviour:** how do we perceive social interactions? What is the difference between the neuroscientific claims of behaviour and the social and philosophical take on the issue. There seems to be a growing trend in describing and understanding

human behaviours in neuro-physiological terms. For example, one aspect that was raised was the role of emotions in decision-making and morality. And this may have an impact on how we define morality and thus on the controversial notion of ‘neuroscience of ethics’ (see below).

3.5 Patient-Doctor Relationship

- Although it was raised several times, the notion of the ‘patient-doctor relationship’ was not tackled thoroughly and thus needs further investigation specifically in regard to the emerging neurotechnologies.
- Is there truly a shift from paternalism to alliance as Gregor called it? Or are these new terms such as ‘alliance’ and ‘concordance,’ mere by-products of the so-called practice of ‘defensive medicine’ that emerged in the USA in the past two decades or so?

3.6 An inquiry into the quartet

- The dynamics and interactions between all the actors involved, namely physicians, pharmacists, patients, and the pharmaceutical industry, should be thoroughly explored.
- Controversies around the psycho-pharmaceutical industry need to be laid out: how do they ‘create’ new applications or new psychiatric categories? What is the evidence behind such claims? Some of the folkloric accusations formulated throughout the conference were unfounded and speculative.

3.7 Neuroethics

- Is there a unified ethical framework? We were only introduced to Mauron’s paradigmatic model of stress though the field of neuroethics that was revived and intensified in 2002 has raised a broad range of possible philosophical frameworks²¹.
- The three notions, *the neuroscience of ethics*, *the ethics of neuroscience*, and *the ethics of equity* need to be investigated independently. Suppose one held a NE-approach to ethics in general. Subsequently, any ethics, including EN, would fall under NE. In such case, there would be no real difference between the two categories since NE would encompass EN. Second, NE can be viewed as a new interpretation of morality. A ‘neuro-ethical framework’ is not yet commonly encountered among the classical ethical frameworks (Kantian, utilitarian, and so on). This newness in explaining morality on neuroscientific grounds is not only significant but could potentially impact the way we think about ethics.
- Although many neuroscientists, social scientists, and policy-makers (Farah 2005; Fukuyama 2002; Hyman 2000; Sahakian & Morein-Zamir 2007; Singh 2005) have already engaged in the debate around some of the impacts and ethical implications of the use and misuse of psychotropic drugs, the debate should embrace all the neurotechnologies including those of potential use in ‘neurosecurity’, ‘counter-terrorism’ and criminal law (such as the ‘brain fingerprinting technology’²²). Also more should be said on the relative renewed interest in neuroenhancement²³ though it is well known that humans have been using psychostimulants to enhance their mood,

²¹ Check Marcus SJ, ed. 2002. *Neuroethics: mapping the field (conference proceedings)*. San Francisco, California: The Dana Press

²² Check for instance Lawrence Farewell’s ‘Brain Fingerprinting Laboratories’ <http://www.brainwavescience.com/> (Accessed December 2007)

²³ The Economist devoted an entire volume on the perils and prospects of neuroscience, ‘The Future of Mind Control’ May 25th 2002.

cognition, and behaviour since the discovery of the mind-altering properties of certain herbal preparations (Hall 2004).

- What are the ethical, social, economic, and political implications related to brain imaging? Again some of the questions have been raised from a normative or ‘bioethical’ perspective solely. Others, like Joseph Dumit (2004), prefer the ethnographic route to critically appraise neurotechnologies such as ‘PET scans’. There is a need to analyze the wider neuroscientific claims that are burgeoning in the scientific literature and that touch not only on issues of identity and personhood, but what essentially define us as human beings, be it in terms of political behaviour, art, love, religiosity, and so on²⁴.
- Besides the tricky definition of what a neuromarket, neuroeconomy indeed neurofinance could possibly amount to, what are the implications of such potential or possible markets?

4. Closing remarks

ENSN played a remarkable role by virtue of allowing the birth of such a unique and much needed platform that brings together theoreticians and practitioners, scientists and social scientists, sceptics and enthusiasts from across disciplines and schools of thought. Such a challenging forum was necessary, inevitable and timely amid prevailing speculations, clashes of discourses, and thought-styles. ENSN’s next challenge will be to formulate innovative theoretical and methodological ways of investigating these empirical disciplines in a ‘neuro-age’ whereby claims to unravel and explain human behaviour, and other aspects intrinsically linked to what defines us as a species, are predominantly formulated in neurochemical terms. By fulfilling that challenging mission, ENSN would have transcended its alleged role of a bridge or catalyst and take part as a full-blown actor in the co-production of the different emerging knowledges of the human brain and the human mind.

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<http://www.lse.ac.uk/collections/brainSelfSociety/Default.htm>

²⁴ On politics, see Kaplan JT, Freedman J, Iacoboni M. 2007. Us versus them: Political attitudes and party affiliation influence neural response to faces of presidential candidates. *Neuropsychologia* 45:55-64; On love, see Bartels A, Zeki S. 2004. The neural correlates of maternal and romantic love. *Neuroimage* 21:1155-66, Zeki S. 2007. The neurobiology of love. *FEBS Lett* 581:2575-9; On belief, see Harris S, Sheth SA, Cohen MS. 2008. Functional neuroimaging of belief, disbelief, and uncertainty. *Ann Neurol* 63:141-7

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